

AMENDMENTS TO THE CLAIMS

Please replace the set of the pending claims with the following list of claims:

1. (currently amended) A modified photocatalyst sol comprising a liquid medium having dispersed therein particles of a modified photocatalyst,

said particles of a modified photocatalyst being prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R^1 and R^2 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group, a C_1 - C_{20} alkoxy group and a halogen atom,



wherein R^1 is as defined for formula (1), and



wherein said modifier compound contains at least one silicon atom having bonded thereto at least one hydrogen atom,

wherein said modification treatment is conducted in the presence of a dehydrogenation-condensation catalyst which has dehydrogenation-condensation activity with respect to said hydrogen atom bonded to the silicon atom of the modifier compound,

said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less.

2. (original) The modified photocatalyst sol according to claim 1, wherein said photocatalyst particles prior to said modification treatment have a volume mean particle diameter of 200 nm or less.

3. (previously presented) The modified photocatalyst sol according to claim 1, wherein said modified photocatalyst particles have a volume mean particle diameter of 200 nm or less to the exclusion of moieties of the particles which moieties are derived from the modifier compound.

4. (original) The modified photocatalyst sol according to any one of claims 1 to 3, which, after allowed to stand at 30 °C for 100 days, maintains a volume mean particle diameter of said modified photocatalyst particles at 800 nm or less.

5. (previously presented) The modified photocatalyst sol according to any one of claims 1 to 3, wherein said modifier compound has a sensitizing group.

6. (previously presented) The modified photocatalyst sol according to any one of claims 1 to 3, wherein said modifier compound has at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a carboxyl group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group.

7. (original) The modified photocatalyst sol according to claim 6, wherein said modifier compound has at least one reactive group selected from the group consisting of a hydrazine group and a keto group.

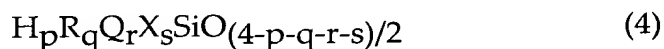
8. (previously presented) The modified photocatalyst sol according to any one of claims 1 to 3, wherein said modifier compound is self-emulsifiable or soluble in water.

9. (cancelled).

10. (cancelled).

11. (currently amended) The modified photocatalyst sol according to claim ~~10~~ 1, wherein said dehydrogenation-condensation catalyst comprises at least one metal of the platinum group or a compound thereof.

12. (currently amended) The modified photocatalyst sol according to claim ~~9~~ 1, wherein said modifier compound is a silicon compound having an average structural composition represented by the following formula (4):



wherein:

each R independently represents a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,

each Q independently represents a group having at least one function-imparting group selected from the group consisting of:

1) at least one hydrophobic group selected from the group

consisting of a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group and a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom, and a C₁-C₃₀ fluoroalkyl group;

2) at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group;

3) at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group; and

4) at least one sensitizing group,

each X independently represents a hydrolyzable group selected from the group consisting of a C₁-C₂₀ alkoxy group, a hydroxyl group, a hydroxyimino group, an enoxy group, an amino group, an amido group, a C₁-C₂₀ acyloxy group, an aminoxy group and a halogen atom, and

p, q, r and s satisfy the following relationships:

$$0 < p < 4,$$

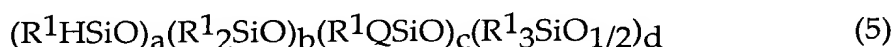
$$0 < q < 4,$$

$$0 \leq r < 4,$$

$$0 \leq s < 2, \text{ and}$$

$$(p + q + r + s) < 4.$$

13. (currently amended) The modified photocatalyst sol according to claim 12, wherein said silicon compound ~~is~~ has an average structural composition represented by the following formula (5):



wherein:

R^1 is as defined for formula (1) and Q is as defined for formula (4),

a represents an integer of 1 or more,

each of b and c independently represents an integer of 0 or more,

d is 0 or 2,

wherein a, b and c satisfy the following relationship:

$$(a + b + c) \leq 10,000, \text{ and}$$

wherein when $(a + b + c) \geq 2$ and d is 0, the compound of formula (5) is a cyclic silicone compound, and when d is 2, the compound of formula (5) is a straight chain silicone compound.

14. (currently amended) A modified photocatalyst composition comprising the modified photocatalyst sol of any one of claims 1 to 3 and at least one functional substance selected from the group consisting of a monomer and a resin.

15. (original) The modified photocatalyst composition according to claim 14, wherein said functional substance is a resin.

16. (original) The modified photocatalyst composition according to claim 15, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

17. (previously presented) The modified photocatalyst composition according to claim 15, wherein said modifier compound has at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a carboxyl group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group, and said resin is capable of reacting with said reactive group of said modified photocatalyst sol.

18. (previously presented) The modified photocatalyst composition according to claim 14, wherein said modifier compound has at least one reactive group selected from the group consisting of a hydrazine group and a keto group, and said functional substance is at least one compound selected from the group consisting of a polycarbonyl compound and a polyhydrazine compound.

19. (original) The modified photocatalyst composition according to claim 14, wherein said functional substance is a coating resin composition.

20. (original) The modified photocatalyst composition according to claim 14, wherein said functional substance is a compound having a surface energy larger than that of each modified photocatalyst particle.

21. (original) The modified photocatalyst composition according to claim 14, wherein said functional substance is a coating composition comprising a resin having a surface energy larger than that of each modified photocatalyst particle.

22. (cancelled).

23. (cancelled).

24. (cancelled).

25. (previously presented) A modified photocatalyst/resin composite composition which is produced by polymerizing at least one compound selected from

the group consisting of a vinyl compound and a hydrolyzable silane compound in the presence of the modified photocatalyst sol of any one of claims 1 to 3.

26. (previously presented) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst sol of any one of claims 1 to 3.

27. (previously presented) A shaped article produced by shaping the modified photocatalyst composition of claim 14.

28. (previously presented) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 14.

29. (original) A shaped article produced by shaping the modified photocatalyst composition of claim 20, which is anisotropic with respect to the distribution of the modified photocatalyst.

30. (previously presented) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 20 and being anisotropic with respect to the distribution of the modified photocatalyst.

31. (cancelled).

32. (cancelled).

33. (cancelled).

34. (cancelled).

35. (original) A shaped article produced by shaping the modified photocatalyst/resin composite composition of claim 25.

36. (original) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst/resin composite composition of claim 25.

37. (previously presented) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 21 and being anisotropic with respect to the distribution of the modified photocatalyst.

38. (cancelled).

39. (new) The shaped article according to claim 27, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

40. (new) The shaped article according to claim 29, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

41. (new) The shaped article according to claim 35, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

42. (new) The shaped article according to claim 27, which has a photoelectric conversion function.

43. (new) The shaped article according to claim 29, which has a photoelectric conversion function.

44. (new) The shaped article according to claim 35, which has a photoelectric conversion function.

45. (new) The functional composite according to claim 26, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

46. (new) The functional composite according to claim 28, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

47. (new) The functional composite according to claim 30, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

48. (new) The functional composite according to claim 36, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

49. (new) The functional composite according to claim 26, which has a photoelectric conversion function.

50. (new) The functional composite according to claim 28, which has a photoelectric conversion function.

51. (new) The functional composite according to claim 30, which has a photoelectric conversion function.

52. (new) The functional composite according to claim 36, which has a photoelectric conversion function.

53. (new) Modified photocatalyst particles having a volume mean particle diameter of 800 nm or less, which are obtained by removing the liquid medium from the modified photocatalyst sol of any one of claims 1 to 3.

54. (new) The modified photocatalyst particles according to claim 53, wherein the modifier compound has at least one reactive group selected from the group

consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a carboxyl group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group.

55. (new). The modified photocatalyst particles according to claim 53, wherein the modifier compound has at least one reactive group selected from the group consisting of a hydrazine group and a keto group.

56. (new) A modified photocatalyst composition comprising the modified photocatalyst particles of claim 53 and at least one functional substance selected from the group consisting of a monomer and a resin.

57. (new) A modified photocatalyst composition comprising the modified photocatalyst particles of claim 54 and at least one functional substance selected from the group consisting of a monomer and a resin.

58. (new) A modified photocatalyst composition comprising the modified photocatalyst particles of claim 55 and at least one functional substance selected from the group consisting of a monomer and a resin.

59. (new) The modified photocatalyst composition according to claim 56, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

60. (new) The modified photocatalyst composition according to claim 57, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

61. (new) The modified photocatalyst composition according to claim 58, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

62. (new) The modified photocatalyst composition according to claim 56, wherein said resin is capable of reacting with a reactive group of said modified photocatalyst particles.

63. (new) The modified photocatalyst composition according to claim 57, wherein said resin is capable of reacting with a reactive group of said modified photocatalyst particles.

64. (new) The modified photocatalyst composition according to claim 58, wherein said resin is capable of reacting with a reactive group of said modified photocatalyst particles.

65. (new) The modified photocatalyst composition according to claim 56, wherein said functional substance is at least one compound selected from the group consisting of a polycarbonyl compound and a polyhydrazine compound.

66. (new) The modified photocatalyst composition according to claim 57, wherein said functional substance is at least one compound selected from the group consisting of a polycarbonyl compound and a polyhydrazine compound.

67. (new) The modified photocatalyst composition according to claim 58, wherein said functional substance is at least one compound selected from the group consisting of a polycarbonyl compound and a polyhydrazine compound.

68. (new) The modified photocatalyst composition according to claim 56, wherein said functional substance is a compound having a surface energy larger than that of each modified photocatalyst particle.

69. (new) The modified photocatalyst composition according to claim 57, wherein said functional substance is a compound having a surface energy larger than that of each modified photocatalyst particle.

70. (new) The modified photocatalyst composition according to claim 58, wherein said functional substance is a compound having a surface energy larger than that of each modified photocatalyst particle.

71. (new) The modified photocatalyst composition according to claim 56, wherein said functional substance is a coating composition comprising a resin having a surface energy larger than that of each modified photocatalyst particle.

72. (new) The modified photocatalyst composition according to claim 57, wherein said functional substance is a coating composition comprising a resin having a surface energy larger than that of each modified photocatalyst particle.

73. (new) The modified photocatalyst composition according to claim 58, wherein said functional substance is a coating composition comprising a resin having a surface energy larger than that of each modified photocatalyst particle.

74. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 56.

75. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 57.

76. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 58.

77. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 56.

78. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 57.

79. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 58.

80. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 68, which is anisotropic with respect to the distribution of the modified photocatalyst particles.

81. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 69, which is anisotropic with respect to the distribution of the modified photocatalyst particles.

82. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 70, which is anisotropic with respect to the distribution of the modified photocatalyst particles.

83. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 68 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

84. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 69 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

85. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 70 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

86. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 71 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

87. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 72 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

88. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 73 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

89. (new) The shaped article according to claim 74, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

90. (new) The shaped article according to claim 75, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

91. (new) The shaped article according to claim 76, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

92. (new) The functional composite according to claim 77, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

93. (new) The functional composite according to claim 78, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

94. (new) The functional composite according to claim 79, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

95. (new) The shaped article according to claim 74, which has a photoelectric conversion function.

96. (new) The shaped article according to claim 75, which has a photoelectric conversion function.

97. (new) The shaped article according to claim 76, which has a photoelectric conversion function.

98. (new) The functional composite according to claim 77, which has a photoelectric conversion function.

99. (new) The functional composite according to claim 78, which has a photoelectric conversion function.

100. (new) The functional composite according to claim 79, which has a photoelectric conversion function.

101. (new) A modified photocatalyst composition comprising particles of a modified photocatalyst, and at least one functional compound selected from the group consisting of a monomer and a resin,

said particles of a modified photocatalyst being prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting

of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R^1 and R^2 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group, a C_1 - C_{20} alkoxy group and a halogen atom,



wherein R^1 is as defined for formula (1), and



wherein said at least one functional compound has a surface energy larger than that of each modified photocatalyst particle by 2 dyne/cm or more so that said modified photocatalyst composition in the form of a film or a shaped article exhibits anisotropy with respect to the distribution of the modified photocatalyst particles.

102. (new) The modified photocatalyst composition according to claim 101, which further comprises a liquid medium having dispersed therein said modified photocatalyst particles, and wherein said modified photocatalyst particles have a volume mean particle diameter of 800 nm or less.

103. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound has a sensitizing group.

104. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound has at least one reactive group selected from the group consisting of an Si-H group, an alkoxysilyl group, a hydroxysilyl group, a halogenated silyl group, an acetoxysilyl group, an aminoxysilyl group, an acetoacetyl group, a thiol group, an acid anhydride group, an epoxy group, an acryloyl group, a methacryloyl group, a keto group, a carboxyl group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group.

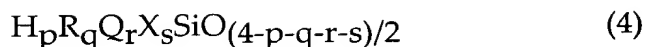
105. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound has at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group.

106. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound contains at least one silicon atom having bonded thereto at least one hydrogen atom.

107. (new) The modified photocatalyst composition according to claim 106, wherein said modification treatment is conducted in the presence of a dehydrogenation-condensation catalyst which has dehydrogenation-condensation activity with respect to said hydrogen atom bonded to the silicon atom of the modifier compound.

108. (new) The modified photocatalyst composition according to claim 107, wherein said dehydrogenation-condensation catalyst comprises at least one metal of the platinum group or a compound thereof.

109. (new) The modified photocatalyst composition according to claim 107, wherein said modifier compound is a silicon compound having an average structural composition represented by the following formula (4):



wherein:

each R independently represents a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,

each Q independently represents a group having at least one function-imparting group selected from the group consisting of:

- 1) at least one hydrophobic group selected from the group consisting of a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group and a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom, and a C₁-C₃₀ fluoroalkyl group;
- 2) at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group;
- 3) at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group,

an amino group, a cyclic carbonate group and an ester group;
and

4) at least one sensitizing group,

each X independently represents a hydrolyzable group selected from the group consisting of a C₁-C₂₀ alkoxy group, a hydroxyl group, a hydroxyimino group, an enoxy group, an amino group, an amido group, a C₁-C₂₀ acyloxy group, an aminoxy group and a halogen atom, and

p, q, r and s satisfy the following relationships:

$$0 < p < 4,$$

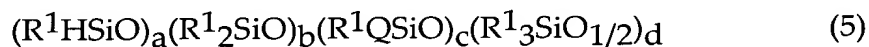
$$0 < q < 4,$$

$$0 \leq r < 4,$$

$$0 \leq s < 2, \text{ and}$$

$$(p + q + r + s) < 4.$$

110. (new) The modified photocatalyst composition according to claim 109, wherein said silicon compound is represented by the following formula (5):



wherein:

R¹ is as defined for formula (1) and Q is as defined for formula (4),

a represents an integer of 1 or more,

each of b and c independently represents an integer of 0 or more,

d is 0 or 2,

wherein a, b and c satisfy the following relationship:

$$(a + b + c) \leq 10,000, \text{ and}$$

wherein when $(a + b + c) \geq 2$ and d is 0, the compound of formula (5) is a cyclic silicone compound, and when d is 2, the compound of formula (5) is a straight chain silicone compound.

111. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound has a C_1 - C_{30} fluoroalkyl group.

112. (new) The modified photocatalyst composition according to claim 111, wherein said modifier compound is a fluoroalkyl compound represented by the following formula (11):



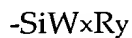
wherein:

g represents an integer of from 0 to 29;

Y represents an organic group having a valence of w and a molecular weight of from 14 to 50,000;

w represents an integer of from 1 to 20;

each V independently represents a functional group selected from the group consisting of an epoxy group, a hydroxyl group, an acetoacetyl group, a thiol group, an acid anhydride group, a carboxyl group, a sulfonic acid group, a polyoxyalkylene group and a group represented by the following formula:



wherein:

each W independently represents a functional group selected from the group consisting of a C_1 - C_{20} alkoxy group, a hydroxyl group, a C_1 - C_{20}

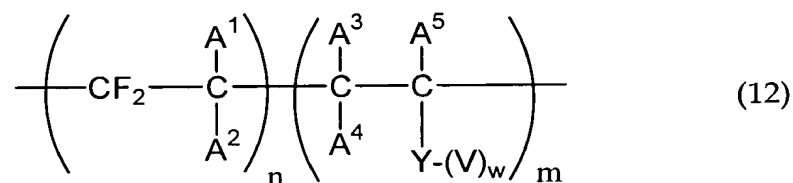
acyloxy group, a halogen atom, a hydrogen atom, a C₁-C₂₀ oxime group, an enoxy group, an aminoxy group and an amido group;

each R independently represents a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom; and

x represents an integer of from 1 to 3 and y represents an integer of from 0 to 2, wherein x + y = 3.

113. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said modifier compound is a fluoroalkylene compound having a number average molecular weight of from 100 to 1,000,000.

114. (new) The modified photocatalyst composition according to claim 112, wherein said modifier compound is a fluoroolefin polymer represented by the following formula (12):



wherein:

each A¹ to A⁵ independently represents an atom or group selected from the group consisting of a fluorine atom, a hydrogen atom, a chlorine atom, a C₁-C₆ alkyl group and a halogenated C₁-C₆ alkyl group;

m represents an integer of from 10 to 1,000,000;

n represents an integer of from 0 to 1,000,000;

Y represents an organic group having a valency of w and a molecular weight of from 14 to 50,000;

w represents an integer of from 1 to 20; and

V is as defined for formula (11) above.

115. (new) The modified photocatalyst composition according to claim 101 or 102, wherein said functional substance is a coating resin composition.

116. (new). A shaped article produced by shaping the modified photocatalyst composition of claim 101 or 102, which is anisotropic with respect to the distribution of the modified photocatalyst particles.

117. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 101 or 102 and being anisotropic with respect to the distribution of the modified photocatalyst particles.

118. (new) The shaped article according to claim 116, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

119. (new) The functional composite according to claim 117, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

120. (new) The shaped article according to claim 116, which has a photoelectric conversion function.

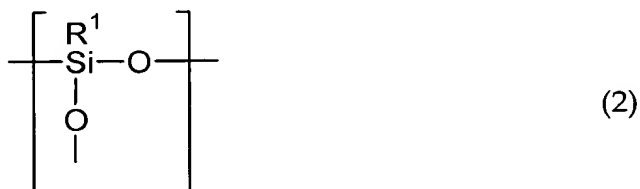
121. (new) The functional composite according to claim 117, which has a photoelectric conversion function.

122. (new) Modified photocatalyst particles prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound

selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R^1 and R^2 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group, a C_1 - C_{20} alkoxy group and a halogen atom,



wherein R^1 is as defined for formula (1), and



said modifier compound having a sensitizing group.

123. (new) The modified photocatalyst particles according to claim 122, wherein said sensitizing group has characteristics that an absorption is exhibited in the wavelength range of 400 nm or more and that the energy level of the lowest unoccupied molecular orbital is higher than the energy level of the conduction band of said photocatalyst.

124. (new) The modified photocatalyst particles according to claim 122, which have a volume mean particle diameter of 800 nm or less.

125. (new) The modified photocatalyst particles according to any one of claims 122 to 124, wherein said modifier compound has at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a carboxyl group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group.

126. (new) The modified photocatalyst particles according to any one of claims 122 to 124, wherein said modifier compound has at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group.

127. (new) The modified photocatalyst composition according to any one of claims 122 to 124, wherein said modifier compound contains at least one silicon atom having bonded thereto at least one hydrogen atom.

128. (new) A modified photocatalyst sol comprising a liquid medium having dispersed therein the modified photocatalyst particles of any one of claims 122 to 124.

129. (new). A modified photocatalyst composition comprising the modified photocatalyst particles of any one of claims 122 to 124 and at least one functional substance selected from the group consisting of a monomer and a resin.

130. (new) The modified photocatalyst composition according to claim 129, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

131. (new) The modified photocatalyst composition according to claim 129, wherein said resin is capable of reacting with a reactive group of said modified photocatalyst particles.

132. (new) The modified photocatalyst composition according to claim 129, wherein said functional substance is a coating resin composition.

133. (new) A modified photocatalyst/resin composite composition which is produced by polymerizing at least one compound selected from the group consisting of a vinyl compound and a hydrolyzable silane compound in the presence of the modified photocatalyst particles of any one of claims 122 to 124.

134. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst particles of any one of claims 122 to 124.

135. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 129.

136. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 129.

137. (new) The shaped article according to claim 135, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

138. (new) The functional composite according to claim 134, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

139. (new) The shaped article according to claim 135, which has a photoelectric conversion function.

140. (new) The functional composite according to claim 134, which has a photoelectric conversion function.

141. (new) Modified photocatalyst particles prepared by subjecting particles of a photocatalyst to a modification treatment, in the absence of a dehydrogenation-condensation catalyst, with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R^1 and R^2 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group, a C_1 - C_{20} alkoxy group and a halogen atom,



wherein R^1 is as defined for formula (1), and



said modifier compound having at least one group selected from the group consisting of:

at least one reactive group selected from the group consisting of an acid anhydride group, a keto group, a hydrazine group, and a cyclic carbonate group, and

at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group.

142. (new) The modified photocatalyst particles according to claim 141, which have a volume mean particle diameter of 800 nm or less.

143. (new). The modified photocatalyst particles according to claims 141 or 142, wherein said modifier compound is self-emulsifiable or soluble in water.

144. (new) The modified photocatalyst particles according to claim 141 or 142, wherein said modifier compound contains at least one silicon atom having bonded thereto at least one hydrogen atom.

145. (new) A modified photocatalyst sol comprising a liquid medium having dispersed therein the modified photocatalyst particles of claim 141 or 142.

146. (new). A modified photocatalyst composition comprising the modified photocatalyst particles of claim 141 or 142 and at least one functional substance selected from the group consisting of a monomer and a resin.

147. (new) The modified photocatalyst composition according to claim 146, wherein said resin is at least one resin selected from the group consisting of a silicone resin and a fluoro resin.

148. (new) The modified photocatalyst composition according to claim 146, wherein said functional substance is a coating resin composition.

149. (new) A modified photocatalyst/resin composite composition which is produced by polymerizing at least one compound selected from the group consisting of a vinyl compound and a hydrolyzable silane compound in the presence of the modified photocatalyst particles of claim 141 or 142.

150. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst particles of claim 141 or 142.

151. (new) A shaped article produced by shaping the modified photocatalyst composition of claim 146.

152. (new) A shaped article produced by shaping the modified photocatalyst/resin composite composition of claim 149.

153. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst composition of claim 146.

154. (new) A functional composite comprising a substrate and a film formed on said substrate, said film comprising the modified photocatalyst/resin composite of claim 149.

155. (new) The shaped article according to claim 151, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

156. (new). The shaped article according to claim 152, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

157. (new) The functional composite according to claim 150, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

158. (new) The functional composite according to claim 153, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

159. (new) The functional composite according to claim 154, which exhibits a photocatalyst activity and/or a hydrophilicity or a hydrophobicity when irradiated with light.

160. (new) The shaped article according to claim 151, which has a photoelectric conversion function.

161. (new) The shaped article according to claim 152, which has a photoelectric conversion function.

162. (new) The functional composite according to claim 150, which has a photoelectric conversion function.

163. (new) The functional composite according to claim 153, which has a photoelectric conversion function.

164. (new) The functional composite according to claim 154, which has a photoelectric conversion function.

165. (new) A modified photocatalyst sol comprising a liquid medium having dispersed therein particles of a modified photocatalyst,

said particles of a modified photocatalyst being prepared by subjecting particles of a photocatalyst to a modification treatment with a modifier compound which is a silicon compound is represented by the following formula (5):



wherein:

each R^1 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group and a halogen atom,

Q represents a group having at least one function-imparting group selected from the group consisting of:

1) at least one hydrophobic group selected from the group

consisting of a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group and a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom, and a C₁-C₃₀ fluoroalkyl group;

2) at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group;

3) at least one reactive group selected from the group consisting of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group; and

4) at least one sensitizing group,

a represents an integer of 1 or more,

each of b and c independently represents an integer of 0 or more,

d is 0 or 2,

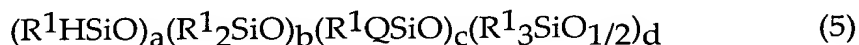
wherein a, b and c satisfy the following relationship:

$(a + b + c) \leq 10,000$, and

wherein when $(a + b + c) \geq 2$ and d is 0, the compound of formula (5) is a cyclic silicone compound, and when $(a + b + c) \geq 1$ and d is 2, the compound of formula (5) is a straight chain silicone compound,

said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less.

166. (new) Modified photocatalyst particles which are prepared by subjecting particles of a photocatalyst to a modification treatment with a modifier compound which is a silicon compound is represented by the following formula (5):



wherein:

each R^1 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group or a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group and a halogen atom,

Q represents a group having at least one function-imparting group selected from the group consisting of:

- 1) at least one hydrophobic group selected from the group consisting of a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl group and a C_6 - C_{20} aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C_1 - C_{20} alkyl group, a C_1 - C_{20} alkoxy group and a halogen atom, and a C_1 - C_{30} fluoroalkyl group;
- 2) at least one hydrophilic group selected from the group consisting of a carboxyl group and a salt thereof, a phosphate group and a salt thereof, a sulfonic acid group and a salt thereof, and a polyoxyalkylene group;
- 3) at least one reactive group selected from the group consisting

of an epoxy group, an acryloyl group, a methacryloyl group, an acid anhydride group, a keto group, a hydrazine group, an isocyanate group, an isothiocyanate group, a hydroxyl group, an amino group, a cyclic carbonate group and an ester group; and

4) at least one sensitizing group,

a represents an integer of 1 or more,

each of b and c independently represents an integer of 0 or more,

d is 0 or 2,

wherein a, b and c satisfy the following relationship:

$(a + b + c) \leq 10,000$, and

wherein when $(a + b + c) \geq 2$ and d is 0, the compound of formula (5) is a cyclic silicone compound, and when $(a + b + c) \geq 1$ and d is 2, the compound of formula (5) is a straight chain silicone compound,

said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less.

167. (new) Modified photocatalyst particles which are prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R^1 and R^2 independently represents a hydrogen atom, a straight chain or branched C_1 - C_{30} alkyl group, a C_5 - C_{20} cycloalkyl

group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,



wherein R¹ is as defined for formula (1), and



wherein said modifier compound contains at least one silicon atom having bonded thereto at least one hydrogen atom,

wherein said modification treatment is conducted in the presence of a dehydrogenation-condensation catalyst which has dehydrogenation-condensation activity with respect to said hydrogen atom bonded to the silicon atom of the modifier compound,

said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less.

168. (new) Modified photocatalyst particles which are prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R¹ and R² independently represents a hydrogen atom, a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl

group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,



wherein R¹ is as defined for formula (1), and



said at least one modifier compound having a sensitizing group,
said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less.

169. (new) A modified photocatalyst composition comprising:

a modified photocatalyst sol comprising a liquid medium having dispersed therein particles of a modified photocatalyst,

said particles of a modified photocatalyst being prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R¹ and R² independently represents a hydrogen atom, a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at

least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,



wherein R¹ is as defined for formula (1), and



said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less; and

at least one functional substance selected from the group consisting of a monomer and a resin.

170. (new) A modified photocatalyst composition comprising:

particles of a modified photocatalyst which is prepared by subjecting particles of a photocatalyst to a modification treatment with at least one modifier compound selected from the group consisting of different compounds each of which independently comprises at least one structural unit selected from the group consisting of a monooxydiorganosilane unit represented by formula (1), a dioxyorganosilane unit represented by formula (2), and a difluoromethylene unit represented by formula (3):



wherein each of R¹ and R² independently represents a hydrogen atom, a straight chain or branched C₁-C₃₀ alkyl group, a C₅-C₂₀ cycloalkyl group or a C₆-C₂₀ aryl group which is unsubstituted or substituted with at

least one substituent selected from the group consisting of a C₁-C₂₀ alkyl group, a C₁-C₂₀ alkoxy group and a halogen atom,



wherein R¹ is as defined for formula (1), and



said modified photocatalyst particles having a volume mean particle diameter of 800 nm or less; and

at least one substance selected from the group consisting of a monomer and a resin.